In re Patent Application of
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filtering the video data stream in real time for
correcting/modifying defective pixel values.

34. A method according to Claim 33, wherein the
step of filtering comprises filtering each pixel value based
on a plurality of adjacent pixel values.

35. A method according to Claim 34, wherein the
step of filtering comprises filtering each pixel value using a
current pixel value as part of a data set including the
plurality of adjacent pixel values for determining whether to
correct/modify the current pixel value and how to
correct/modify the current pixel value.

36. A method according to Claim 33, wherein the
electronic imaging system comprises a memory; the method
further comprising the steps of:
identifying defective pixel values;
storing locations of the defective pixel values in
the memory;
filtering pixel values not stored in the memory
using a first filtering algorithm; and
filtering the defective pixel values stored in the
memory using a second filtering algorithm.

37. A method according to Claim 36, wherein the
filtering of each pixel value is based on a plurality of
adjacent pixel values; the first filtering algorithm using a
current pixel value as part of a data set including the
plurality of adjacent pixel values.

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38.   A method according to Claim 37, wherein the first filtering algorithm implements the steps of:

sorting the current pixel value and the plurality of adjacent pixel values into a rank order based upon a predetermined criteria; and

modifying the current pixel value with respect to its rank in the rank order.

39.   A method according to Claim 38, wherein the current pixel value is modified if its rank is greater than a predetermined maximum rank value or less than a predetermined minimum rank value.

40.   A method according to Claim 39, further comprising:

replacing the current pixel value by a pixel value having the predetermined maximum rank value if the rank of the current pixel value is greater than the predetermined maximum rank value;

replacing the current pixel value by a pixel value having the predetermined minimum rank value if the rank of the current pixel value is less than the predetermined minimum rank value; and

leaving the current pixel value unchanged if the current pixel value has a rank less than the predetermined maximum rank value and greater than the predetermined minimum rank value.

41.   A method according to Claim 40, wherein the predetermined maximum rank value is a highest ranking of the plurality of adjacent pixel values, and the predetermined

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minimum rank value is a lowest ranking of the plurality of
adjacent pixel values.

42. A method according to Claim 36, wherein the
step of storing locations of the defective pixel values is
based upon an output of the first filtering algorithm.

43. A method according to Claim 42, wherein the
step of storing comprises storing the location of each
defective pixel value based on a magnitude of a difference
between the current pixel value and the pixel value
corresponding to the output of the first filtering algorithm.

44. A method according to Claim 43, wherein
location of at least one pixel value having a greatest
difference in magnitude from the output of the first filtering
algorithm is stored in the memory for each frame of video
data.

45. A method according to Claim 36, wherein the
filtering of each pixel value is based on the plurality of
adjacent pixel values; and the second filtering algorithm
excludes a current pixel value from a data set including the
plurality of adjacent pixel values.

46. A method according to Claim 45, wherein the
second filtering algorithm replaces the current pixel value
with a median value of the plurality of adjacent pixel values.

47. A method according to Claim 36, wherein the
step of storing comprises storing a defect value corresponding

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to a magnitude of the defect exhibited by each defective pixel value.

48. A method according to Claim 47, further comprising updating contents of the memory using a predetermined memory management algorithm.

49. A method according to Claim 48, further comprising the step of updating the defect value of each defective pixel value based upon an auto-regression function applied to a current pixel value of each defective pixel location stored in the memory, a current output from the second filtering algorithm and a current stored defect value.

50. A method according to Claim 36, wherein the first and second filtering algorithms are applied to the video data stream in parallel, and a final output pixel value is selected from outputs of the first and second filtering algorithms depending on whether a corresponding pixel location is stored in the memory.

51. A method for filtering a video data stream comprising a series of pixel values corresponding to pixel sites in an electronic imaging device, the method comprising the steps of:

filtering each pixel value using a current pixel value as part of a data set including a plurality of adjacent pixel values;

sorting the current pixel value and the plurality of adjacent pixel values into a rank order based upon a predetermined criteria; and

modifying the current pixel value with respect to its rank in the rank order.

52. A method according to Claim 51, wherein the current pixel value is modified if its rank is greater than a predetermined maximum rank value or less than a predetermined minimum rank value.

53. A method according to Claim 52, further comprising:
    replacing the current pixel value by a pixel value having the predetermined maximum rank value if the rank of the current pixel value is greater than the predetermined maximum rank value;
    replacing the current pixel value by a pixel value having the predetermined minimum rank value if the rank of the current pixel value is less than the predetermined minimum rank value; and
    leaving the current pixel value unchanged if the current pixel value has a rank less than the predetermined maximum rank value and greater than the predetermined minimum rank value.

54. A method according to Claim 53, wherein the predetermined maximum rank value is a highest ranking of the plurality of adjacent pixel values, and the predetermined minimum rank value is a lowest ranking of the plurality of adjacent pixel values.

55. An apparatus for processing a video data stream comprising:

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a filter circuit for filtering the video data stream
in real time for correcting/modifying defective pixel values,
the video data stream comprising a series of pixel values
corresponding to pixel sites in an electronic imaging device.

56. An apparatus according to Claim 55, further
comprising a sampling circuit connected to said filter for
sampling the video data stream to obtain a data set comprising
a current pixel value and a plurality of adjacent pixel
values.

57. An apparatus according to Claim 56, further
comprising a ranking circuit connected to said sampling
circuit for sorting the plurality of adjacent pixel values
into a rank order based upon a predetermined criteria.

58. An apparatus according to Claim 57, further
comprising a comparator connected to said ranking circuit for
comparing a current pixel value with the plurality of adjacent
pixel values of selected ranks, and for generating a first
filter output based upon the comparison.

59. An apparatus according to Claim 58, further
comprising a median circuit connected to said ranking circuit
for determining a median value of the plurality of adjacent
pixel values and for generating a second filter output equal
to the median value.

60. An apparatus according to Claim 59, further
comprising a memory connected to said comparator for storing
pixel locations selected based upon the first filter output.

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61. An apparatus according to Claim 59, further comprising an output circuit connected to said median circuit, said ranking circuit and said memory for generating a final output pixel value selected from the first and second filter outputs based upon contents of said memory.

62. An electronic imaging system comprising:

an image sensor array; and

a filter circuit connected to said image sensor array for filtering a video data stream in real time for correcting/modifying defective pixel values, the video data stream comprising a series of pixel values corresponding to pixel sites in said image sensor array.

63. An apparatus for processing a video data stream comprising:

a filter circuit for filtering a video data stream comprising a series of pixel values corresponding to pixel sites in an electronic imaging device, wherein the filtering of each pixel value is based on a current pixel value as part of a data set including a plurality of adjacent pixel values; and

a ranking circuit connected to said filter circuit for sorting the current pixel value and the plurality of adjacent pixel values into a rank order based upon a predetermined criteria; and

a modifier circuit connected to said ranking circuit for modifying the current pixel value with respect to its rank in the rank order.

64. An electronic imaging system comprising:

an image sensor array;

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